

At p. 43, line 18, replace "smoothes" with --smooths--.

At p. 46, line 12, insert --a video image 804 of-- before "image modulator 245."

In the Claims

Please cancel Claims 1-49 without prejudice.

Please add new Claims 50-97.

Sub D --50. An image processing apparatus for receiving bitstream data and processing said bitstream data to provide video stream image data to a display device, comprising:

A a display input processor (DIP) coupled to a databus, said DIP comprising an input data connector and a first plurality of processing modules configured to receive bitstream data input and reconstruct said input to generate DIP outputs;

a display output processor (DOP) coupled to said databus, said DOP comprising a second plurality of processing modules configured to process said DIP outputs for generating DOP outputs, said second plurality comprising a geometric transformation (GT) module and a post GT filtering module; and

a buffer memory, coupled to said databus, configured to store said DIP outputs and said DOP outputs, and to provide said video stream image data to said display device.

Sub D²

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51. The apparatus of claim 50 wherein said DOP comprises a display map memory (DMM).

52. The apparatus of claim 51 wherein said DMM is configured to store system configuration information which includes intensity values for setup of said display device.

53. The apparatus of claim 50 wherein said geometric transformation (GT) module is configured to geometrically transform said DIP inputs.

54. The apparatus of claim 53 wherein said GT module comprises:

a spatial transformation module configured to redefine spatial relationships between image pixels;

an alignment and rotation correction module configured to reposition image pixels;

a focus correction module configured to correct image defocus; and

a distortion correction module configured to correct image distortions.

55. The apparatus of claim 54 wherein said alignment and rotation correction module is configured to rotate images.

A1 contd

1 56. The apparatus of claim 54 wherein said focus correction
2 module is configured to correct said image for defocus resulting from
3 image deformation and from display optics.

4
5 57. The apparatus of claim 54 wherein said spatial
6 transformation module is configured to use frame information and motion
7 tracking information from multiple input images to increase image
8 resolution.

9
10 58. The apparatus of claim 57 wherein said spatial
11 transformation module is configured to select motion tracking information
12 from either a compressed bitstream or a motion estimator output.

13
14 59. The apparatus of claim 53 wherein said GT module is
15 configured to improve skew, tangential symmetry, aspect angle, and scale-
16 related distortions of said display images.

17
18 60. The apparatus of claim 53 wherein said GT module is
19 configured to correct environment-introduced image artifacts.

20 61. The apparatus of claim 53 wherein said GT module is
21 configured to correct artifacts resulting from non-uniformity of the
22 display device.
23

1 62. The apparatus of claim 53 wherein said GT module
2 comprises a texture mapping module.

3
4 63. The apparatus of claim 53 wherein said DOP is configured
5 to use a mathematical formula for providing DOP outputs suitable for
6 a panoramic projection.

7
8 64. The texture mapping module of claim 63, where said
9 module is configured to use texture mapping to perform transitions for
10 multi-picture displays.

11
12 65. The apparatus of claim 53 wherein said GT module
13 comprises a multi-frame correlation module.

14 66. The apparatus of claim 65 wherein said multi-frame
15 correlation module is configured to select motion compensation
16 information from either a selected display image or a motion estimator
17 output.

18
19 67. The apparatus of claim 50 wherein said DIP is configured
20 to receive data as a coded bitstream, said bitstream comprising image
21 object information, image object depths, and image motion tracking
22 information.
23

1 68. The apparatus of claim 67 configured to provide image data
2 for a 3D and/or a panoramic display device.

3
4 69. The apparatus of claim 68 configured to use said image
5 object information to reposition objects in output coordinates of said
6 panoramic display device.

7
8 70. The apparatus of claim 68 configured to output image data
9 to film.

10
11 71. The apparatus of claim 68 configured to receive a coded
12 input that represents two images and use said coded input to present a
13 3D stereoscopic image on said display device.

14 72. The apparatus of claim 50 configured to simultaneously
15 receive multiple video streams and process such streams to provide an
16 image from each video stream in a single display using Picture-in-Picture
17 and windowing controls.

18
19 73. The apparatus of claim 72 wherein said GT module is
20 configured to perform transition effects between the different video
21 streams, such transition effect including fades, blends, wipes and warps.

D2 concl.
1 74. The apparatus of claim 50 wherein said DIP comprises an
2 image reconstruction module configured for performing multiframe
3 reconstruction to increase image resolutions.

Sub D3
4
5 75. The apparatus of claim 74, wherein said multiframe
6 reconstruction module is configured to use motion estimation vectors
7 from an input bitstream to correlate multiple images.

A' cont'd
8
9 *Sub D4* 76. An apparatus configured for processing bitstream data to
10 form video stream image data for use in a display system, comprising:
11 a display device, coupled to said display system, for viewing image
12 data;
13 a geometric transformation GT module coupled to said display
14 device, said GT module configured to precondition said bitstream data
15 using geometric transformations to compensate for characteristics of said
16 display device; and
17 a temporal gamma processing TGP module coupled to said display
18 device, said TGP module configured to determine an output intensity
19 value for each color component output to said display device.

20
21 77. The TGP module of claim 76 comprising a plurality of
22 look-up tables, wherein said TGP is configured to use at least one of
23 said plurality of tables for determining color correction.

1 78. The apparatus of claim 76 wherein said geometric
2 transformation module comprises a spatial transformation module
3 configured for redefining spatial relationships between image pixels
4 derived from said bitstream information.

5
6 79. The apparatus of claim 76 wherein said geometric
7 transformation module comprises an alignment and rotation correction
8 module configured for repositioning said image pixels.

9
10 80. The apparatus of claim 76 wherein said geometric
11 transformation module comprises a focus correction module configured for
12 correcting image defocus.

13
14 81. The apparatus of claim 76 wherein said geometric
15 transformation module comprises a distortion correction module
16 configured for correcting image distortions.

17
18 82. The apparatus of claim 76 wherein said geometric
19 transformation module comprises a multi-frame correlation module
20 configured for performing motion-compensated frame rate conversion.

21 83. The apparatus of claim 76 wherein said geometric
22 transformation module is configured to improve skew, tangential
23 symmetry, aspect angle, and scale-related distortions of said image data.

A1
central
D4
central

b 84. A method for processing bitstream information to form
from video stream image data
images for use in a display system having a display device, comprising:
receiving said bitstream information into a display input processor
(DIP);
processing said received bitstream information to generate DIP
outputs;
receiving said DIP outputs into a display output processor (DOP);
processing said DIP outputs with a geometric transformation (GT)
module to generate DOP outputs;
directing said DOP outputs to a buffer memory module; and
providing images based on said DOP outputs to said display device.

A1 cont'd
D4 cont'd
85. The method of claim 84 wherein processing said DIP output
comprises said geometric transformation module preconditioning said DIP
outputs using geometric transformations to compensate for characteristics
of said display system.

86. The method of claim 85 wherein processing said DIP
outputs comprises using a spatial transformation module for redefining
spatial relationships between image pixels derived from said DIP outputs.

1 87. The method of claim 85 wherein processing said DIP
2 outputs comprises using an alignment and rotation correction module for
3 repositioning image pixels derived from said DIP outputs.

4
5 88. The method of claim 85 wherein processing said DIP
6 outputs comprises using a focus correction module for correcting image
7 defocus in image data contained within said DOP outputs.

8
9 89. The method of claim 85 wherein processing said DIP
10 outputs comprises using a distortion correction module for correcting
11 image distortions in image data contained within said DOP outputs.

12
13 90. The method of claim 85 wherein processing said DIP
14 outputs comprises using a multi-frame correlation module for performing
15 motion-compensated frame rate conversion in image data contained within
16 said DOP outputs.

17
18 91. The method of claim 85 wherein processing said DIP
19 outputs comprises improving skew, tangential symmetry, aspect angle, and
20 scale-related distortions in image data contained within said DOP
21 outputs.

1 92. The method of claim 84 wherein processing said received
2 bitstream information to generate DIP outputs comprises processing with
3 an image reconstruction module that utilizes or masks motion estimation
4 vectors based on matching accuracy of motion estimation blocks
5 associated with said motion estimation vectors.
6

7 93. The method of claim 92 wherein utilizing motion estimation
8 vectors comprises processing until sub-block motion estimation is
9 discerned.
10

11 94. The method of claim 92, wherein utilizing motion estimation
12 vectors comprises using enhanced matching processing techniques which
13 include rotation, scale and sheer techniques.
14

15 95. The method of claim 92 wherein processing with an image
16 reconstruction module comprises processing bitstream information
17 comprising multiple images from multiple cameras.
18

19 96. The method of claim 84 wherein processing said DIP output
20 comprises utilizing a temporal gamma processing (TGP) module to ^{independently}
21 determine, for each color component, an intensity value to output to said
22 display device.
23